

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: A. Stoyanov et al. Attorney Docket No.: 25384  
Application No.: 10/815,206 Art Unit: 1731 / Confirmation No: 9520  
Filed: March 31, 2004 Examiner: D.R. Cordray  
Title: BLEACHED CROSSLINKED CELLULOSIC FIBERS WITH HIGH COLOR AND BRIGHTNESS

DECLARATION OF KATHY A. WELCH PURSUANT TO 37 C.F.R. § 1.131

Seattle, Washington 98101

April 13, 2006

TO THE COMMISSIONER FOR PATENTS:

I, Kathy A. Welch, declare as follows:

1. I am employed by Weyerhaeuser Company as a Scientist.
2. I have read and am familiar with U.S. Patent Application No. 10/815,206, (the '206 application).
3. I have read and am familiar with U.S. Patent Application Publication No. US 2003/0208859 A1 ("the Neogi reference") that published November 13, 2003.
4. Prior to the publication date of the Neogi reference, I conducted pilot line trials in which cellulose fibers were crosslinked with a crosslinking agent in the presence of a polyol and then bleached. These bleached crosslinked fibers were prepared under the direction of Angel Stoyanov, M.Sc., an inventor of the subject matter claimed in the '206 application. The following describes two pilot line runs Trial T-75 and Trial 82 performed on September 8, 2003 and October 28, 2003 respectively, that provided cellulosic fibers crosslinked with citric acid in the presence of sorbitol described in Table 4 of the '206 application.
  - a. In Trial 75, southern pine kraft pulp (CF416) was crosslinked with an impregnation solution including citric acid (crosslinking agent), sodium hypophosphite (SHP, crosslinking catalyst), and sorbitol as set forth on page 1 of my laboratory

notebook (**Exhibit A** attached to this declaration). The crosslinked fibers were then treated with a bleaching agent that was either hydrogen peroxide or a combination of hydrogen peroxide and sodium peroxide. The target bleaching conditions for the trial, Samples B, H, L and N in Table 4 of the '206 application are set forth on the same page of my laboratory notebook. The corresponding notebook entries are in the Run Matrix on page 1 in **EXHIBIT A** are listed under the Run ID as C, D, H and I, respectively. Unbleached control samples represented by samples A, K and M in Table 4 correspond to Run ID B, G and J, respectively, in the Run Matrix on page 1. The treated pulp was separated into individualized fibers and cured to provide citric acid crosslinked fibers.

b. For each run, nine (9) samples were taken in duplicate. Sample B in Table 4 is represented by C-1 to C-9, page 22 and 23; sample H by D1 to D-9, page 23; sample L by H , page 24; and sample N by I, page 24 and 25 (see **Exhibit B**). Unbleached control samples A, K, and M in Table 4 (which correspond to Run ID B, G and J, respectively, in the Run Matrix on page1), are represented by BB-1 to BB-9, page 22; G, page 24 and J, page 25, respectively. Each run was sampled at the baler feed and the samples were taken at approximately two minute intervals during each run.

c. Hunter *L*, *a*, and *b* values were measured. The results were tabulated as set forth on pages cited in paragraph c., above.

d. In Trial 82, southern pine kraft pulp (CF416) was crosslinked with an impregnation solution including citric acid (crosslinking agent), sodium hypophosphite (SHP, crosslinking catalyst), and sorbitol as set forth on page 1 of my laboratory notebook (**Exhibit C** attached to this declaration). The citric acid crosslinked fibers were treated with a bleaching agent that was either hydrogen peroxide or a combination of hydrogen peroxide and sodium peroxide. The target bleaching conditions for the trial,

Samples I and J in Table 4 are set forth on page 83 of my laboratory notebook. The corresponding notebook entries are under the Run ID as E and F, respectfully in the Run Matrix. Unbleached control samples previously mentioned in paragraph b., above.

e. For each run, five (5) samples were taken. Sample I is represented by E, page 92 and sample J by F, page 92. Each run was sampled at the baler feed and the samples were taken at approximately two minute intervals during each run.

f. Hunter *L*, *a*, and *b* values were measured. The results were tabulated as set forth on pages 92, **EXHIBIT D**.

5. All of the bleached crosslinked cellulose fibers described above were prepared prior to November 13, 2003. In accordance with accepted Patent Office practice, the dates in my laboratory notebook pages presented in **EXHIBITS A-D** have been redacted.

6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

Date: 4/13/06

Kathy A. Welch  
Kathy A. Welch

APPL Trial 75 Determine CS-10 Cure

Time &amp; Temp. to Hit 5k and Hunter b Targets

APPL Trial T-75

Day 1

Kaw

Project Manager: Angel Stoyanov  
Project Number: 00050 W532 615 874 731 142-4506**Objective:**

- Determine the interaction of cure time and temperature leading to a cross-link product with 5k and Hunter b values of 0.15 and 5, or less for both, respectively.

**Safety:**

- Normal safety precautions taken with operation of the APPL unit.
- Read MSDS for Sorbitol and handle per MSDS recommendations.

**Run Conditions:**

Pulp Type: CF416  
 Pulp Sheet Linear Feed Rate: 60 fpm  
 Hammermill Nozzle Gap: 0.095 inches  
 Hammermill Rotor Tip Speed: 16,493 fpm  
 Impregnation Solutions Concentration: CS10 Control 11.62% solids  
 Sorbitol: 11.61% solids

**Impregnation Solutions pH's**

Adjust to 2.0 - 2.1 for the Control solution.  
 Measure and Record for the Sorbitol solutions.

**Target Hammermill Feed Consistency:**

61%

**Target Chemical on ODCP Pulp (all is 100% Purity):**

CS10 Control - 7.6% Citric Acid, 0.683% SHP & Caustic, 0.181% Sorbitol, 6.0% Citric Acid, 0.75% SHP & 1.5% Sorbitol

**Impregnation Solution Rotameter Setting:**

See Run Matrix

**Nominal Cure Temperature:**

See Run Matrix

**Nominal Cure Time:**

See Run Matrix

**Target Product Moisture:**

See Run Matrix

**Remoisturization Solution:**

See Run Matrix

**Remoisturization Rotameter Setting:**

60% of scale (20 psi water &amp; 28 psi air)

Run ID	Impregnation		Cure Conditions		Post Treatment	
	Solution	Rotameter Setting % of scale	Cure Temperature F	Cure Time minutes	Hydrogen Peroxide #/ADMT	Caustic #/ADMT
A	CS10 Control	44.7	360	5	0.0	0.0
B	Sorbitol	44.6	360	5	0.0	0.0
C	Sorbitol	44.6	360	5	0.8	2.5
D	Sorbitol	44.5	350	7	0.8	2.5
E	Sorbitol	44.5	360	7	0.0	0.0
F	CS10 Control	44.7	360	5	0.0	0.0
G	Sorbitol	44.6	360	5	0.0	0.0
H	Sorbitol	44.5	360	5	0.8	2.5
I	Sorbitol	44.5	360	7	0.8	2.5
J	Sorbitol	44.5	360	7	0.0	0.0

**Samples:**

Pulp Feed Rolls: 1 sample per roll  
 Hammermill Feed: 3 samples per run condition  
 Baler Feed: 9 samples at 2 minute intervals during steady state operation for each Run Condition

Note: Chloroacetone samples will only be taken for Samples 1, 4 and 9 for each Run Conditions

Planning Summary T-075.doc

1 OF 2

Witnessed &amp; Understood by me:

Date

Investigated by

Date

Recorded by

Walter (Welch)

Page No. 2

Project No. 142-4506

Book No. 14605

EXHIBIT D

TITLE ARQL Trial 75 (cont.)

Page No. 21/60

Change the Sample ID font from gray to black after entering new data.

Color Day 0

Trial	Point	Variable	Sampling Condition	Sampling Sequence	Pad	Replicate	Sampling Date	Test Date	Days Aged	Brightness					
										L*	a*	b*	L*	a*	b*
75	BF	A-1	1	1	a	09/08/03	09/08/03	0	73.02	93.06	-1.54	10.77	04.55	1.33	11.14
75	BF	A-1	1	1	b	09/08/03	09/08/03	0	72.40	92.93	-1.58	11.12	04.47	1.46	11.53
								average	72.71	93.00	-1.44	10.86	04.53	1.46	11.34
75	BF	A-2	2	1	a	09/08/03	09/08/03	0	78.10	93.79	-1.12	0.46	05.15	1.06	9.56
75	BF	A-2	2	1	b	09/08/03	09/08/03	0	75.51	93.75	-1.36	0.73	05.17	1.03	10.04
								average	76.81	93.77	-1.20	0.57	05.14	1.22	9.80
75	BF	A-3	3	1	a	09/08/03	09/08/03	0	73.19	93.04	-1.39	10.64	04.55	1.34	11.00
75	BF	A-3	3	1	b	09/08/03	09/08/03	0	72.81	92.97	-1.57	10.20	04.47	1.47	11.16
								average	73.00	93.01	-1.46	10.72	04.52	1.41	11.08
75	BF	A-4	4	1	a	09/08/03	09/08/03	0	74.02	93.29	-1.42	10.24	04.05	1.38	10.00
75	BF	A-4	4	1	b	09/08/03	09/08/03	0	74.12	93.28	-1.27	10.12	04.72	1.24	10.48
								average	74.07	93.29	-1.36	10.18	04.57	1.31	10.54
75	BF	A-5	5	1	a	09/08/03	09/08/03	0	72.39	92.51	-1.32	10.84	04.52	1.28	11.35
75	BF	A-5	5	1	b	09/08/03	09/08/03	0	72.81	92.07	-1.39	10.07	04.42	1.30	11.24
								average	72.60	92.29	-1.35	10.50	04.50	1.29	11.30
75	BF	A-6	6	1	a	09/08/03	09/08/03	0	74.36	93.44	-1.28	10.20	04.62	1.25	10.91
75	BF	A-6	6	1	b	09/08/03	09/08/03	0	74.95	93.62	-1.39	10.01	05.07	1.33	10.28
								average	74.65	93.63	-1.34	10.15	04.84	1.34	10.40
75	BF	A-7	7	1	a	09/08/03	09/08/03	0	72.60	93.06	-1.56	11.17	04.58	1.55	11.53
75	BF	A-7	7	1	b	09/08/03	09/08/03	0	73.37	93.72	-1.07	0.89	05.08	1.37	10.14
								average	73.98	93.40	-1.38	10.58	04.88	1.46	11.84
75	BF	A-8	8	1	a	09/08/03	09/08/03	0	74.32	93.47	-1.41	10.22	04.64	1.37	10.53
75	BF	A-8	8	1	b	09/08/03	09/08/03	0	74.98	93.50	-1.38	0.97	05.09	1.35	11.25
								average	74.64	93.48	-1.38	10.10	04.67	1.34	10.38
75	BF	A-9	9	1	a	09/08/03	09/08/03	0	73.73	93.43	-1.49	10.77	04.86	1.45	11.06
75	BF	A-9	9	1	b	09/08/03	09/08/03	0	73.74	93.43	-1.48	10.60	04.86	1.44	11.04
								average	73.74	93.43	-1.47	10.67	04.86	1.45	11.05
75	BF	BB-1	1	1	a	09/08/03	09/08/03	0	81.00	94.03	-1.48	0.60	05.05	1.42	6.82
75	BF	BB-1	1	1	b	09/08/03	09/08/03	0	81.91	94.02	-1.27	0.60	05.04	1.47	6.52
								average	81.96	94.03	-1.48	0.65	05.06	1.48	6.57
75	BF	BB-2	2	1	a	09/08/03	09/08/03	0	82.04	94.06	-1.49	0.60	05.02	1.44	6.42
75	BF	BB-2	2	1	b	09/08/03	09/08/03	0	82.70	95.13	-1.03	0.15	05.20	1.31	6.14
								average	82.37	95.06	-1.42	0.28	05.14	1.38	6.28
75	BF	BB-3	3	1	a	09/08/03	09/08/03	0	82.20	95.08	-1.49	0.43	05.08	1.30	6.44
75	BF	BB-3	3	1	b	09/08/03	09/08/03	0	82.35	95.09	-1.42	0.35	05.17	1.37	6.37
								average	82.28	95.08	-1.41	0.35	05.17	1.36	6.41
75	BF	BB-4	4	1	a	09/08/03	09/08/03	0	82.00	95.26	-1.25	0.05	05.33	1.19	6.04
75	BF	BB-4	4	1	b	09/08/03	09/08/03	0	83.44	95.45	-1.22	0.07	05.45	1.17	6.00
								average	82.22	95.27	-1.19	0.07	05.37	1.18	6.02
75	BF	BB-5	5	1	a	09/08/03	09/08/03	0	83.68	95.35	-1.22	0.77	05.45	1.19	5.71
75	BF	BB-5	5	1	b	09/08/03	09/08/03	0	83.42	95.29	-1.24	0.76	05.37	1.20	5.77
								average	83.06	95.34	-1.22	0.76	05.37	1.19	5.74
75	BF	BB-6	6	1	a	09/08/03	09/08/03	0	83.77	95.42	-1.13	0.70	05.45	1.06	5.68
75	BF	BB-6	6	1	b	09/08/03	09/08/03	0	84.10	95.61	-1.13	0.71	05.56	1.14	5.68
								average	83.94	95.52	-1.18	0.71	05.51	1.12	5.69
75	BF	BB-7	7	1	b	09/08/03	09/08/03	0	83.41	95.31	-1.27	0.53	05.34	1.22	5.76
75	BF	BB-7	7	1	b	09/08/03	09/08/03	0	83.60	95.40	-1.24	0.73	05.42	1.18	5.71
								average	83.50	95.35	-1.26	0.77	05.38	1.21	5.75
75	BF	BB-8	8	1	b	09/08/03	09/08/03	0	83.03	95.47	-1.25	0.52	05.34	1.11	5.70
75	BF	BB-8	8	1	b	09/08/03	09/08/03	0	83.40	95.54	-1.25	0.52	05.34	1.11	5.76
								average	83.22	95.50	-1.22	0.52	05.34	1.11	5.74
75	BF	BB-9	9	1	a	09/08/03	09/08/03	0	83.29	95.27	-1.14	0.50	05.26	1.10	5.78
75	BF	BB-9	9	1	b	09/08/03	09/08/03	0	83.89	95.46	-1.15	0.56	05.43	1.11	5.74
								average	83.59	95.36	-1.14	0.53	05.34	1.11	5.77
75	BF	C-1	1	1	a	09/08/03	09/08/03	0	83.22	95.06	-1.22	0.64	05.13	1.23	5.02
75	BF	C-1	1	1	b	09/08/03	09/08/03	0	83.80	95.26	-1.22	0.56	05.24	1.17	5.46
								average	83.51	95.16	-1.21	0.59	05.22	1.23	5.04
75	BF	C-2	2	1	a	09/08/03	09/08/03	0	83.97	95.24	-1.20	0.51	05.29	1.21	5.39
75	BF	C-2	2	1	b	09/08/03	09/08/03	0	84.02	95.22	-1.20	0.54	05.27	1.24	5.33
								average	83.99	95.23	-1.21	0.53	05.27	1.21	5.38
75	BF	C-3	3	1	b	09/08/03	09/08/03	0	82.94	95.19	-1.26	0.57	05.25	1.20	5.01
75	BF	C-3	3	1	b	09/08/03	09/08/03	0	83.93	95.19	-1.26	0.57	05.25	1.21	5.00
								average	83.20	95.19	-1.27	0.57	05.24	1.25	5.78
75	BF	C-4	4	1	a	09/08/03	09/08/03	0	83.24	95.24	-1.24	0.56	05.20	1.20	5.73
75	BF	C-4	4	1	b	09/08/03	09/08/03	0	82.84	95.09	-1.26	0.53	05.15	1.34	5.08
								average	83.03	95.16	-1.27	0.53	05.15	1.27	5.88
75	BF	C-5	5	1	a	09/08/03	09/08/03	0	83.62	95.38	-1.21	0.57	05.40	1.20	5.68
75	BF	C-5	5	1	b	09/08/03	09/08/03	0	83.42	95.31	-1.21	0.54	05.38	1.26	5.72
								average	83.52	95.34	-1.20	0.53	05.38	1.26	5.68
75	BF	C-6	6	1	a	09/08/03	09/08/03	0	83.71	95.27	-1.22	0.51	05.31	1.17	5.60
75	BF	C-6	6	1	b	09/08/03	09/08/03	0	83.57	95.42	-1.16	0.56	05.45	1.12	5.98
								average	83.69	95.37	-1.15	0.53	05.34	1.16	5.84

XCL

XCL

Project No. 142-4506

Book No. 460

TITLE

AQR Trial 75 (cont.)

23

Trial	Point	Variable	Sampling Condition	Sampling Sequence	Pad	Replicate	Sampling Date	Test Date	Days Aged	Brightness		L*		a*		b*			
										a	b	L*	a*	b*	a	b			
75	BF	C-7	7	1	a	09/08/03	09/08/03	0	03-38-05-49	123	61.15	96.46	-1.18	6.13					
75	BF	C-7	7	1	b	09/08/03	09/08/03	0	03-39-05-49	125	59.97	95.46	-1.14	5.85					
75	BF	C-6	8	1	a	09/08/03	09/08/03	0	average	105.40	95.47	1.21	0.00	96.47	-1.16	6.04			
75	BF	C-6	8	1	b	09/08/03	09/08/03	0	04-00-05-49	106	12.29	96.61	-1.01	5.19					
75	BF	C-5	9	1	a	09/08/03	09/08/03	0	average	04-01-05-49	104	6.10	96.66	-1.00	5.26				
75	BF	C-5	9	1	b	09/08/03	09/08/03	0	04-02-05-49	105	12.40	96.66	-1.06	5.55					
75	BF	D-5	1	1	a	09/08/03	09/08/03	0	average	04-10-05-49	114	1.00	96.52	-1.13	5.86				
75	BF	D-5	1	1	b	09/08/03	09/08/03	0	03-71-05-49	108	5.70	96.43	-1.06	5.86					
75	BF	D-4	2	1	a	09/08/03	09/08/03	0	average	03-16-05-49	126	6.48	96.36	-1.32	6.46				
75	BF	D-4	2	1	b	09/08/03	09/08/03	0	02-97-05-49	124	5.97	96.24	-1.19	5.86					
75	BF	D-3	3	1	a	09/08/03	09/08/03	0	average	02-03-05-49	127	0.00	96.26	-1.22	6.04				
75	BF	D-3	3	1	b	09/08/03	09/08/03	0	03-25-05-49	124	6.00	96.36	-1.20	5.89					
75	BF	D-4	4	1	a	09/08/03	09/08/03	0	average	03-10-05-49	127	6.02	96.32	-1.22	6.02				
75	BF	D-4	4	1	b	09/08/03	09/08/03	0	04-10-05-49	115	0.00	96.36	-1.52	6.89					
75	BF	D-5	5	1	a	09/08/03	09/08/03	0	average	02-12-05-49	126	5.50	96.36	-1.06	7.16				
75	BF	D-5	5	1	b	09/08/03	09/08/03	0	02-60-05-49	126	5.50	96.45	-1.30	6.57					
75	BF	D-6	6	1	a	09/08/03	09/08/03	0	average	02-17-05-49	124	6.43	96.41	-1.26	6.44				
75	BF	D-6	6	1	b	09/08/03	09/08/03	0	03-10-05-49	125	6.53	96.45	-1.30	6.40					
75	BF	D-7	7	1	a	09/08/03	09/08/03	0	average	02-10-05-49	126	5.40	96.40	-1.30	6.47				
75	BF	D-7	7	1	b	09/08/03	09/08/03	0	02-22-05-49	126	5.41	96.13	-1.42	6.41					
75	BF	D-8	8	1	a	09/08/03	09/08/03	0	average	02-42-05-49	126	5.22	96.15	-1.35	6.22				
75	BF	D-8	8	1	b	09/08/03	09/08/03	0	02-08-05-49	125	5.22	96.27	-1.36	6.52					
75	BF	D-9	9	1	a	09/08/03	09/08/03	0	average	02-20-05-49	126	5.22	96.40	-1.40	6.66				
75	BF	D-9	9	1	b	09/08/03	09/08/03	0	01-08-05-49	126	5.22	96.42	-1.40	6.66					
75	BF	E-1	1	1	a	09/08/03	09/08/03	0	average	01-08-05-49	126	5.22	96.14	-1.42	6.76				
75	BF	E-1	1	1	b	09/08/03	09/08/03	0	01-00-05-49	126	5.18	96.18	-1.43	7.40					
75	BF	E-2	2	1	a	09/08/03	09/08/03	0	average	01-03-05-49	126	5.18	96.30	-1.39	7.11				
75	BF	E-2	2	1	b	09/08/03	09/08/03	0	01-42-05-49	126	5.01	96.19	-1.45	7.11					
75	BF	E-3	3	1	a	09/08/03	09/08/03	0	average	01-76-05-49	126	5.11	96.31	-1.42	7.00				
75	BF	E-3	3	1	b	09/08/03	09/08/03	0	02-61-05-49	125	5.11	96.27	-1.44	6.75					
75	BF	E-4	4	1	a	09/08/03	09/08/03	0	average	02-20-05-49	126	5.22	96.42	-1.40	6.66				
75	BF	E-4	4	1	b	09/08/03	09/08/03	0	01-08-05-49	126	5.22	96.42	-1.40	6.66					
75	BF	E-5	5	1	a	09/08/03	09/08/03	0	average	00-56-05-49	126	5.31	96.52	-1.27	6.97				
75	BF	E-5	5	1	b	09/08/03	09/08/03	0	01-36-05-49	126	5.31	96.45	-1.47	6.85					
75	BF	E-6	6	1	a	09/08/03	09/08/03	0	average	00-56-05-49	126	5.33	96.58	-1.37	6.91				
75	BF	E-6	6	1	b	09/08/03	09/08/03	0	01-36-05-49	126	5.33	96.19	-1.48	6.91					
75	BF	E-7	7	1	a	09/08/03	09/08/03	0	average	01-73-05-49	126	5.33	96.18	-1.42	7.00				
75	BF	E-7	7	1	b	09/08/03	09/08/03	0	01-00-05-49	126	5.21	96.27	-1.36	6.86					
75	BF	E-8	8	1	a	09/08/03	09/08/03	0	average	02-22-05-49	126	5.33	96.32	-1.32	6.42				
75	BF	E-8	8	1	b	09/08/03	09/08/03	0	01-06-05-49	126	5.33	96.22	-1.40	6.86					
75	BF	E-9	9	1	a	09/08/03	09/08/03	0	average	01-16-05-49	126	5.33	96.14	-1.42	6.76				
75	BF	E-9	9	1	b	09/08/03	09/08/03	0	01-46-05-49	126	5.33	96.14	-1.42	6.76					
75	BF	E-10	10	1	a	09/08/03	09/08/03	0	average	01-46-05-49	126	5.33	96.14	-1.42	6.76				
75	BF	E-10	10	1	b	09/08/03	09/08/03	0	01-46-05-49	126	5.33	96.14	-1.42	6.76					
75	BF	E-11	11	1	a	09/08/03	09/08/03	0	average	01-03-05-49	126	5.33	96.14	-1.42	6.76				
75	BF	E-11	11	1	b	09/08/03	09/08/03	0	01-00-05-49	126	5.33	96.14	-1.42	6.76					
75	BF	E-12	12	1	a	09/08/03	09/08/03	0	average	01-00-05-49	126	5.33	96.14	-1.42	6.76				
75	BF	E-12	12	1	b	09/08/03	09/08/03	0	01-00-05-49	126	5.33	96.14	-1.42	6.76					
75	BF	E-13	13	1	a	09/08/03	09/08/03	0	average	01-00-05-49	126	5.33	96.14	-1.42	6.76				
75	BF	E-13	13	1	b	09/08/03	09/08/03	0	01-00-05-49	126	5.33	96.14	-1.42	6.76					
75	BF	E-14	14	1	a	09/08/03	09/08/03	0	average	01-00-05-49	126	5.33	96.14	-1.42	6.76				
75	BF	E-14	14	1	b	09/08/03	09/08/03	0	01-00-05-49	126	5.33	96.14	-1.42	6.76					
75	BF	E-15	15	1	a	09/08/03	09/08/03	0	average	01-00-05-49	126	5.33	96.14	-1.42	6.76				
75	BF	E-15	15	1	b	09/08/03	09/08/03	0	01-00-05-49	126	5.33	96.14	-1.42	6.76					
75	BF	E-16	16	1	a	09/08/03	09/08/03	0	average	01-00-05-49	126	5.33	96.14	-1.42	6.76				
75	BF	E-16	16	1	b	09/08/03	09/08/03	0	01-00-05-49	126	5.33	96.14	-1.42	6.76					
75	BF	E-17	17	1	a	09/08/03	09/08/03	0	average	01-00-05-49	126	5.33	96.14	-1.42	6.76				
75	BF	E-17	17	1	b	09/08/03	09/08/03	0	01-00-05-49	126	5.33	96.14	-1.42	6.76					
75	BF	E-18	18	1	a	09/08/03	09/08/03	0	average	01-00-05-49	126	5.33	96.14	-1.42	6.76				
75	BF	E-18	18	1	b	09/08/03	09/08/03	0	01-00-05-49	126	5.33	96.14	-1.42	6.76					
75	BF	E-19	19	1	a	09/08/03	09/08/03	0	average	01-00-05-49	126	5.33	96.14	-1.42	6.76				
75	BF	E-19	19	1	b	09/08/03	09/08/03	0	01-00-05-49	126	5.33	96.14	-1.42	6.76					
75	BF	F-1	1	1	a	09/08/03	09/08/03	0	average	01-07-05-49	126	12.29	96.41	-1.28	10.75	94.85	-1.25	11.11	
75	BF	F-1	1	1	b	09/08/03	09/08/03	0	01-07-05-49	126	12.29	96.41	-1.28	10.75	94.86	-1.22	11.16		
75	BF	F-2	2	1	a	09/08/03	09/08/03	0	average	01-07-05-49	126	92.55	12.34	11.56	94.17	-1.30	12.51		
75	BF	F-2	2	1	b	09/08/03	09/08/03	0	01-07-05-49	126	92.55	12.34	11.08	94.50	-1.21	11.50			
75	BF	F-3	3	1	a	09/08/03	09/08/03	0	average	01-07-05-49	126	92.28	12.34	11.00	94.34	-1.26	12.01		
75	BF	F-3	3	1	b	09/08/03	09/08/03	0	01-07-05-49	126	92.28	12.34	11.00	94.09	-1.30	12.32			
75	BF	F-4	4	1	a	09/08/03	09/08/03	0	average	01-07-05-49	126	92.55	12.34	11.00	94.20	-1.41	12.45		
75	BF	F-4	4	1	b														

Project No. 142-4506

Book No. 14615 TITLE

ARPL Trial 75 (cont.)

Page No. 23

1/6/2

Raw

Sampling Trial Point	Variable Condition	Sampling Sequence	Sampling Pad	Replicate	Sampling Date	Total Days	Aged	Brightness	L <sup>a</sup> a <sup>b</sup> b <sup>c</sup> L <sup>d</sup> a <sup>e</sup> b <sup>f</sup>						
									0	1	2	3			
75	BF	E	5	1	a	09/09/03	09/09/03	average	71.17	92.75	-1.47	11.77	94.32	-1.43	12.21
75	BF	F	5	1	b	09/09/03	09/09/03	0	70.24	92.52	-1.30	12.19	94.14	-1.26	12.75
75	BF	F	6	1	a	09/09/03	09/09/03	average	69.68	92.40	-1.36	12.48	94.08	-1.31	13.42
75	BF	F	6	1	b	09/09/03	09/09/03	0	70.65	92.45	-1.36	11.79	94.08	-1.32	12.31
75	BF	F	7	1	a	09/09/03	09/09/03	average	70.44	92.43	-1.38	11.82	94.07	-1.34	12.46
75	BF	F	7	1	b	09/09/03	09/09/03	0	71.14	92.75	-1.28	11.73	94.33	-1.24	12.22
75	BF	F	7	1	c	09/09/03	09/09/03	average	71.26	92.65	-1.32	11.76	94.48	-1.28	12.27
75	BF	F	8	1	a	09/09/03	09/09/03	average	71.20	92.81	-1.30	11.76	94.37	-1.26	12.28
75	BF	F	8	1	b	09/09/03	09/09/03	0	69.43	91.85	-1.33	12.75	93.61	-1.30	13.42
75	BF	F	8	1	c	09/09/03	09/09/03	average	68.52	91.98	-1.36	12.84	93.71	-1.33	13.51
75	BF	F	9	1	a	09/09/03	09/09/03	average	68.48	91.92	-1.35	12.80	93.08	-1.32	13.47
75	BF	F	9	1	b	09/09/03	09/09/03	0	71.79	92.68	-1.34	11.42	94.47	-1.30	11.57
75	BF	F	9	1	c	09/09/03	09/09/03	average	69.17	92.51	-1.48	12.73	93.08	-1.44	13.37
75	BF	G	1	1	a	09/09/03	09/09/03	average	70.48	92.69	-1.41	12.08	94.28	-1.37	12.62
75	BF	G	1	1	b	09/09/03	09/09/03	0	70.64	94.00	-1.81	8.24	95.01	-1.55	8.34
75	BF	G	2	1	a	09/09/03	09/09/03	average	70.76	94.00	-1.02	8.02	95.03	-1.57	8.06
75	BF	G	2	1	b	09/09/03	09/09/03	0	67.80	95.52	-1.77	8.00	94.58	-1.22	8.61
75	BF	G	2	1	c	09/09/03	09/09/03	average	67.41	95.25	-1.05	7.77	95.28	-1.35	7.31
75	BF	G	3	1	a	09/09/03	09/09/03	average	67.11	95.35	-1.34	8.34	94.40	-1.28	8.86
75	BF	G	3	1	b	09/09/03	09/09/03	0	67.52	95.16	-1.04	7.46	95.38	-1.25	7.36
75	BF	G	3	1	c	09/09/03	09/09/03	average	67.70	95.43	-1.31	7.30	95.44	-1.27	7.33
75	BF	G	4	1	a	09/09/03	09/09/03	average	67.81	95.40	-1.01	7.22	95.41	-1.26	7.26
75	BF	G	4	1	b	09/09/03	09/09/03	0	62.19	95.17	-1.28	8.83	95.38	-1.23	8.86
75	BF	G	4	1	c	09/09/03	09/09/03	average	67.84	95.10	-0.94	8.88	95.18	-1.00	8.97
75	BF	G	5	1	a	09/09/03	09/09/03	0	62.02	95.24	-1.17	8.86	95.28	-1.07	8.98
75	BF	G	5	1	b	09/09/03	09/09/03	0	60.92	95.28	-1.44	7.75	95.33	-1.30	7.54
75	BF	G	5	1	c	09/09/03	09/09/03	average	60.75	95.24	-1.41	7.77	95.29	-1.43	7.70
75	BF	G	6	1	a	09/09/03	09/09/03	average	68.80	95.77	-1.46	7.75	95.31	-1.47	7.91
75	BF	G	6	1	b	09/09/03	09/09/03	0	62.04	95.49	-1.19	7.00	95.49	-1.14	7.12
75	BF	G	6	1	c	09/09/03	09/09/03	average	62.63	95.57	-1.14	6.73	95.35	-1.10	6.74
75	BF	G	7	1	a	09/09/03	09/09/03	average	62.34	95.53	-1.17	6.91	95.52	-1.12	8.93
75	BF	G	7	1	b	09/09/03	09/09/03	0	61.90	95.44	-1.26	7.12	95.44	-1.23	7.15
75	BF	G	7	1	c	09/09/03	09/09/03	average	62.46	95.53	-1.27	6.85	95.52	-1.22	8.96
75	BF	G	8	1	a	09/09/03	09/09/03	average	62.15	95.45	-1.24	6.98	95.44	-1.23	7.07
75	BF	G	8	1	b	09/09/03	09/09/03	0	62.39	95.61	-1.25	7.04	95.58	-1.21	7.05
75	BF	G	8	1	c	09/09/03	09/09/03	average	62.57	95.61	-1.24	6.86	95.57	-1.19	8.02
75	BF	G	9	1	a	09/09/03	09/09/03	average	62.46	95.61	-1.25	6.86	95.68	-1.20	8.97
75	BF	G	9	1	b	09/09/03	09/09/03	0	62.14	95.45	-1.24	6.94	95.45	-1.20	8.96
75	BF	H	1	1	a	09/09/03	09/09/03	average	61.54	95.44	-1.30	7.12	95.45	-1.25	7.18
75	BF	H	1	1	b	09/09/03	09/09/03	0	60.34	95.10	-1.45	7.02	95.11	-1.40	7.06
75	BF	H	2	1	a	09/09/03	09/09/03	average	60.34	95.13	-1.51	8.00	95.22	-1.46	8.07
75	BF	H	2	1	b	09/09/03	09/09/03	0	60.34	95.13	-1.49	7.64	95.28	-1.43	8.02
75	BF	H	3	1	a	09/09/03	09/09/03	average	61.49	95.45	-1.42	7.29	95.39	-1.37	7.43
75	BF	H	3	1	b	09/09/03	09/09/03	0	61.54	95.45	-1.40	7.36	95.44	-1.31	7.36
75	BF	H	4	1	a	09/09/03	09/09/03	average	62.54	95.50	-1.39	6.58	95.63	-1.14	6.60
75	BF	H	4	1	b	09/09/03	09/09/03	0	62.77	95.51	-1.39	6.61	95.61	-1.20	8.81
75	BF	H	4	1	c	09/09/03	09/09/03	average	62.54	95.51	-1.37	6.73	95.62	-1.17	6.74
75	BF	H	5	1	a	09/09/03	09/09/03	0	64.27	95.57	-1.31	6.09	95.79	-1.06	6.03
75	BF	H	5	1	b	09/09/03	09/09/03	0	63.64	95.45	-1.31	6.18	95.74	-1.06	6.06
75	BF	H	5	1	c	09/09/03	09/09/03	average	64.59	95.45	-1.32	6.08	95.77	-1.06	6.06
75	BF	H	6	1	a	09/09/03	09/09/03	0	65.11	95.70	-1.24	6.59	95.65	-1.24	6.54
75	BF	H	6	1	b	09/09/03	09/09/03	0	65.24	95.46	-1.24	6.76	95.46	-1.21	6.70
75	BF	H	7	1	a	09/09/03	09/09/03	average	62.77	95.68	-1.32	6.89	95.56	-1.28	6.88
75	BF	H	7	1	b	09/09/03	09/09/03	0	63.29	95.65	-1.29	6.40	95.61	-1.25	6.39
75	BF	H	8	1	a	09/09/03	09/09/03	average	63.69	95.68	-1.25	6.77	95.63	-1.28	6.74
75	BF	H	8	1	b	09/09/03	09/09/03	0	62.95	95.55	-1.31	7.27	95.53	-1.30	7.30
75	BF	H	9	1	a	09/09/03	09/09/03	average	62.03	95.46	-1.32	7.20	95.53	-1.27	7.23
75	BF	H	9	1	b	09/09/03	09/09/03	0	63.05	95.62	-1.28	6.52	95.59	-1.23	6.52
75	BF	H	9	1	c	09/09/03	09/09/03	average	62.95	95.62	-1.34	6.61	95.57	-1.29	6.61
75	BF	H	1	1	a	09/09/03	09/09/03	average	63.00	94.91	-1.31	6.57	95.58	-1.28	6.57
75	BF	H	1	1	b	09/09/03	09/09/03	0	70.67	94.99	-1.50	8.24	95.09	-1.43	8.34
75	BF	H	2	1	a	09/09/03	09/09/03	average	70.51	94.94	-1.53	8.28	95.05	-1.46	8.38

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1/6/2

1/6/2

1/6/2

TITLE

ARPL Trial 75 (cont.)

Project No. 142-4506

Book No. 14615

25

From Page No. 24

X-6

X-6

Trial	Sampling Point	Variable Condition	Sampling Sequence	Pad	Replicate	Sampling Date	Total Date	Days Aged	Brix	S	D	L	W	B	
										0	1	2	3	4	5
75	BF		2	1	b	09/09/03	09/09/03	0	81.30	95.32	1.41	7.48	98.36	1.39	7.53
75	BF		3	1	a	09/09/03	09/09/03	0	81.05	95.21	1.43	7.61	98.34	1.38	7.67
75	BF		3	1	b	09/09/03	09/09/03	0	82.38	95.40	1.17	6.78	98.48	1.13	6.81
75	BF		4	1	a	09/09/03	09/09/03	0	81.61	95.35	1.38	7.27	98.40	1.33	7.31
75	BF		4	1	b	09/09/03	09/09/03	0	82.08	95.42	1.28	7.03	98.43	1.23	7.06
75	BF		5	1	a	09/09/03	09/09/03	0	82.22	95.44	1.26	6.93	98.45	1.21	6.95
75	BF		5	1	b	09/09/03	09/09/03	0	82.50	95.57	1.26	6.80	98.53	1.21	6.91
75	BF		6	1	a	09/09/03	09/09/03	0	78.70	94.52	1.43	6.39	95.78	1.38	6.50
75	BF		6	1	b	09/09/03	09/09/03	0	78.33	94.64	1.50	6.63	95.82	1.40	6.77
75	BF		7	1	a	09/09/03	09/09/03	0	78.65	94.52	1.47	6.57	95.80	1.40	6.64
75	BF		7	1	b	09/09/03	09/09/03	0	78.55	94.62	1.44	6.69	95.86	1.40	6.78
75	BF		8	1	a	09/09/03	09/09/03	0	77.84	94.70	1.61	9.25	95.86	1.69	6.43
75	BF		8	1	b	09/09/03	09/09/03	0	78.05	94.78	1.63	9.07	95.91	1.48	6.61
75	BF		9	1	a	09/09/03	09/09/03	0	88.23	95.16	1.23	7.92	98.19	1.19	6.00
75	BF		9	1	b	09/09/03	09/09/03	0	88.31	95.21	1.26	8.07	98.26	1.31	6.06
75	BF		9	1	a	09/09/03	09/09/03	0	88.27	95.16	1.29	7.97	98.21	1.26	6.04
75	BF		9	1	b	09/09/03	09/09/03	0	88.40	95.32	1.30	7.39	98.38	1.26	7.43
75	BF		10	1	a	09/09/03	09/09/03	0	87.78	95.33	1.34	7.09	98.38	1.29	7.12
75	BF		10	1	b	09/09/03	09/09/03	0	87.69	95.38	1.32	7.24	98.38	1.28	7.20
75	BF		10	1	a	09/09/03	09/09/03	0	86.42	95.06	1.49	7.77	98.15	1.41	7.00
75	BF		10	1	b	09/09/03	09/09/03	0	86.77	94.98	1.57	7.88	98.00	1.52	7.06
75	BF		11	1	a	09/09/03	09/09/03	0	86.20	95.02	1.52	7.86	98.12	1.47	7.01
75	BF		11	1	b	09/09/03	09/09/03	0	86.70	95.20	1.53	7.83	98.26	1.26	7.00
75	BF		12	1	a	09/09/03	09/09/03	0	79.72	95.12	1.46	6.74	98.20	1.44	6.46
75	BF		12	1	b	09/09/03	09/09/03	0	79.52	95.17	1.46	6.73	98.23	1.38	6.06
75	BF		13	1	a	09/09/03	09/09/03	0	78.40	94.86	1.52	6.18	95.95	1.52	6.26
75	BF		13	1	b	09/09/03	09/09/03	0	78.45	94.86	1.52	6.18	95.77	1.55	6.72
75	BF		13	1	a	09/09/03	09/09/03	0	78.32	94.86	1.52	6.18	95.82	1.54	6.47
75	BF		13	1	b	09/09/03	09/09/03	0	78.53	94.90	1.51	6.17	98.02	1.58	6.33
75	BF		14	1	a	09/09/03	09/09/03	0	78.40	94.90	1.51	6.17	98.07	1.52	6.13
75	BF		14	1	b	09/09/03	09/09/03	0	78.47	94.90	1.50	6.06	98.05	1.50	6.23
75	BF		14	1	a	09/09/03	09/09/03	0	78.22	94.90	1.51	6.06	98.01	1.50	6.30
75	BF		14	1	b	09/09/03	09/09/03	0	78.00	94.92	1.48	6.05	95.95	1.43	6.50
75	BF		15	1	a	09/09/03	09/09/03	0	78.16	94.95	1.46	6.06	95.98	1.48	6.50
75	BF		15	1	b	09/09/03	09/09/03	0	78.76	94.97	1.46	6.02	95.78	1.60	6.24
75	BF		16	1	a	09/09/03	09/09/03	0	78.42	94.57	1.07	6.01	95.76	1.62	6.74
75	BF		16	1	b	09/09/03	09/09/03	0	78.42	94.57	1.07	6.01	95.76	1.61	6.74
75	BF		16	1	a	09/09/03	09/09/03	0	78.40	94.54	1.06	6.02	95.76	1.61	6.74
75	BF		16	1	b	09/09/03	09/09/03	0	78.50	94.65	1.06	6.07	95.87	1.52	6.01
75	BF		17	1	a	09/09/03	09/09/03	0	78.08	94.52	1.05	6.06	95.86	1.53	6.04
75	BF		17	1	b	09/09/03	09/09/03	0	78.18	94.52	1.05	6.06	95.84	1.50	6.00
75	BF		18	1	a	09/09/03	09/09/03	0	78.18	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		18	1	b	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		19	1	a	09/09/03	09/09/03	0	78.18	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		19	1	b	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		20	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		20	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		21	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		21	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		22	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		22	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		23	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		23	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		24	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		24	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		25	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		25	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		26	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		26	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		27	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		27	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		28	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		28	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		29	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		29	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		30	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		30	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		31	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		31	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		32	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		32	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		33	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		33	1	b	09/09/03	09/09/03	0	78.38	94.52	1.05	6.02	95.82	1.52	6.06
75	BF		34	1	a	09/09/03	09/09/03	0	78.28	94.52	1.05	6.02	95.82	1.5	

## EXHIBIT C

Project No. 142-4506

Book No. 14615

83

TITLE APPL Trial 82 Determine CS10 Cure Time

From Page No.

and Temperature to Hit 5K target of 0.15 and Hunter b  
APPL Trial T-82 Target of 5

Xcel

Project Manager: Andrey Slobinov

Project Number: 00050 W332.615 874.731 142-4506

## Objective:

- Determine the interaction of cure time and temperature leading to a cross-link product with 5k and Hunter b values of 0.15 and 5, or less for both, respectively.

## Safety:

- Normal safety precautions taken with operation of the APPL unit.  
Read MSDS for Sorbitol and handle per MSDS recommendations.

## Run Conditions:

Pulp Type: CT416  
 Pulp Sheet Linear Feed Rate: 60 ft/min  
 Hammermill Nozzles Cap: 0.095 inches  
 Hammermill Rotor Tip Speed: 16,493 ft/min  
 Impregnation Solution Concentration: CS10 Control: 11.62% solids  
 Sorbitol: 11.61% solids

Impregnation Solution pH's: Additive A/B = 7.5 for this trial solution  
 Measure = 7.5 based on the standard solution

Target Hammermill Feed Consistency: 61%  
 Target Chemical on ODCP Pulp (all as 100% Purity): CS10 Control: 7.6% Citric Acid, 0.633% SHP, & Causic: 0.161%  
 Sorbitol: 6.0% Citric Acid, 1.7% Sorbitol, & 0.75% SHP

See Run Matrix

Nominal Cure Temperature: 160 °F

Nominal Cure Time: See Run Matrix

Target Product Mixture:

Remoncularization Solution:

Monodispersion Rotometer setting:

60% of scale (20 psi water &amp; 28 psi air)

Run ID	Impregnation	Cure Conditions	Post-Treatment Targets			Post-Treatment Recipe	
			Cure Time: minutes	Caustic: lbs	H <sub>2</sub> O <sub>2</sub> : lbs	NaOH: lbs	H <sub>2</sub> O: lbs
A	CS10:	44.7	5	0.0	0.0	0.0	0.0
B	CS10:	44.7	5	2.5	2.5	183.1	308.2
C	CS10:	44.7	5	2.5	5.0	183.1	629.1
D	Sorbitol:	44.6	7	0.0	0.0	0.0	0.0
E	Sorbitol:	44.6	7	2.5	2.5	183.1	308.2
F	Sorbitol:	44.6	7	5.0	183.1	629.1	

## Samples:

Pulp Feed Rollers: 1 sample per roll.

Hammermill Feed: 3 samples per run condition.

Baler Feed: 5 samples at 2 minute intervals during steady state operation.

Yield

## Sample Analysis:

Pulp Feed Rollers: Moisture

Hammermill Feed: Moisture

Baler Feed: Moisture, Brightness, Hunter and CIE Color (0°, 45°, 90°), Viscosity, and Odor

- Pulp Feed Roll and Hammermill Feed moisture samples will be placed in 20" x 12" sample bags.
- Baler Feed moisture samples will be placed in 9" x 12" bags.
- Baler Feed FAQ Analysis, Brightness and color samples and 5K samples will be placed in 13" x 18" bags (Stack these bags since we will need quite a bit of sample for these analyses).
- Odor samples will be placed in glass bottles. Aged will supply bottles. Take one Sample # 2 + 44.

## Impregnation Chemical Solution:

Chemical Solution Recipe	CS10 Control Solution	Sorbitol Solution
Solution Make-up Contingency Factor:	27.4	26.1
Target Solution Component Weight in Pounds:		
Citric Acid (as-received): lbs.	25.25	29.14
Sorbitol (as-received): lbs.	0.00	7.19
SHP (as-received): lbs.	2.73	3.61
Causic (as-received): lbs.	0.60	0.00
Water, lbs.	208.25	208.25
Total, lbs.	236.83	238.61
Volume of Water, gallons:	25.0	25.0
Impregnation Solution Specific Gravity:	1.05	1.04
Volume of Impregnation Solution, gallons:	27.1	27.1

Witnessed &amp; Understood by me:

Date

Xcel

2-67

1.13

Recorded by: *Kathy Welch*

## EXHIBIT D

Project No 142-4SDG

Book No 14605

TITLE

AR321 Trial 82 (cont.)

Rack

Page No 91

760 Color Day 0

Trial	Point	Condition	Sampling Sequence	Pad	Replicate	Sampling Date	Test Date	Days Aged	Brightness						
									L	a	b	c	d		
02	BF	A	1	1	a	10/28/03	10/28/03	0	76.43	93.98	-1.51	9.33	95.29	-1.46	9.54
02	BF	A	1	1	b	10/28/03	10/28/03	0	76.28	93.95	-1.48	9.39	95.27	-1.43	9.6
02	BF	A	2	1	a	10/28/03	10/28/03	0	76.34	93.87	-1.54	9.34	95.28	-1.45	9.57
02	BF	A	2	1	b	10/28/03	10/28/03	0	74.85	93.32	-1.44	9.02	94.93	-1.4	10.19
02	BF	A	2	1	b	10/28/03	10/28/03	0	73.57	93.22	-1.55	10.59	94.77	-1.5	10.94
02	BF	A	3	1	a	10/28/03	10/28/03	0	74.29	93.37	-1.58	10.26	94.82	-1.45	10.57
02	BF	A	3	1	b	10/28/03	10/28/03	0	74.61	93.48	-1.59	10.05	94.9	-1.55	10.34
02	BF	A	4	1	a	10/28/03	10/28/03	0	73.82	93.28	-1.57	9.97	94.85	-1.47	10.13
02	BF	A	4	1	b	10/28/03	10/28/03	0	74.81	93.24	-1.42	9.77	94.71	-1.18	9.96
02	BF	A	5	1	a	10/28/03	10/28/03	0	74.24	93.42	-1.42	10.31	94.98	-1.38	10.62
02	BF	A	5	1	b	10/28/03	10/28/03	0	74.43	93.35	-1.31	10.04	94.85	-1.25	10.33
02	BF	B	1	1	a	10/28/03	10/28/03	0	74.33	93.45	-1.36	10.23	94.88	-1.31	10.54
02	BF	B	1	1	b	10/28/03	10/28/03	0	74.46	93.44	-1.32	10.16	94.87	-1.23	10.44
02	BF	B	2	1	a	10/28/03	10/28/03	0	78.15	93.37	-1.04	9.14	95.39	-1.09	9.29
02	BF	B	2	1	b	10/28/03	10/28/03	0	76.07	93.37	-1.02	9.35	95.39	-1.05	9.51
02	BF	B	2	1	b	10/28/03	10/28/03	0	76.04	93.32	-1.00	9.35	95.38	-1.02	9.49
02	BF	B	3	1	a	10/28/03	10/28/03	0	80.02	93.15	-1.01	7.46	94.91	-1.74	7.5
02	BF	B	3	1	b	10/28/03	10/28/03	0	81.15	93.77	-1.02	8.01	95.05	-1.93	8.07
02	BF	B	4	1	a	10/28/03	10/28/03	0	82.00	93.32	-1.01	7.63	95.03	-1.84	7.69
02	BF	B	4	1	b	10/28/03	10/28/03	0	81.24	93.74	-1.02	8.2	95.78	-1.85	8.27
02	BF	B	5	1	a	10/28/03	10/28/03	0	81.34	93.61	-1.05	8.2	95.6	-1.84	8.26
02	BF	B	5	1	b	10/28/03	10/28/03	0	82.05	93.69	-1.03	8.07	95.62	-1.83	8.35
02	BF	C	1	1	a	10/28/03	10/28/03	0	83.97	93.18	-1.02	6.59	97.01	-1.63	8.58
02	BF	C	1	1	b	10/28/03	10/28/03	0	82.12	93.57	-1.04	7.12	95.55	-1.79	7.15
02	BF	C	2	1	a	10/28/03	10/28/03	0	83.95	93.62	-1.07	6.86	95.78	-1.71	8.33
02	BF	C	2	1	b	10/28/03	10/28/03	0	82.26	93.72	-1.01	6.94	95.66	-1.73	8.19
02	BF	C	3	1	a	10/28/03	10/28/03	0	83.09	93.64	-1.05	6.86	95.62	-1.67	8.44
02	BF	C	3	1	b	10/28/03	10/28/03	0	84.43	93.67	-1.05	6.63	95.61	-1.67	8.57
02	BF	C	4	1	a	10/28/03	10/28/03	0	83.75	93.69	-1.02	6.67	95.62	-1.65	8.56
02	BF	C	4	1	b	10/28/03	10/28/03	0	81.77	93.62	-1.05	6.82	95.74	-1.74	7.87
02	BF	C	5	1	a	10/28/03	10/28/03	0	84.7	93.67	-1.04	6.59	95.62	-1.67	8.58
02	BF	C	5	1	b	10/28/03	10/28/03	0	82.12	93.57	-1.04	7.12	95.55	-1.79	7.15
02	BF	C	6	1	a	10/28/03	10/28/03	0	83.97	93.62	-1.05	6.63	95.62	-1.67	8.57
02	BF	C	6	1	b	10/28/03	10/28/03	0	82.31	93.62	-1.04	7.53	95.62	-1.76	7.55
02	BF	C	7	1	a	10/28/03	10/28/03	0	83.97	93.67	-1.04	6.67	95.62	-1.67	8.58
02	BF	C	7	1	b	10/28/03	10/28/03	0	82.25	93.67	-1.02	7.05	95.62	-1.75	7.07
02	BF	C	8	1	a	10/28/03	10/28/03	0	82.67	93.61	-1.02	7.43	95.65	-1.73	7.65
02	BF	C	8	1	b	10/28/03	10/28/03	0	82.55	93.64	-1.05	7.63	95.62	-1.69	7.55
02	BF	C	9	1	a	10/28/03	10/28/03	0	82.87	93.23	-1.07	7.59	97.12	-1.81	7.28
02	BF	C	9	1	b	10/28/03	10/28/03	0	82.54	93.09	-1.05	7.62	95.99	-1.63	7.05
02	BF	C	10	1	a	10/28/03	10/28/03	0	81.95	93.63	-1.04	7.61	95.78	-1.67	7.71
02	BF	C	10	1	b	10/28/03	10/28/03	0	82.25	93.69	-1.02	7.05	95.63	-1.65	7.05
02	BF	C	11	1	a	10/28/03	10/28/03	0	82.67	93.61	-1.02	7.43	95.65	-1.73	7.65
02	BF	C	11	1	b	10/28/03	10/28/03	0	82.55	93.64	-1.05	7.63	95.62	-1.69	7.55
02	BF	D	1	1	a	10/28/03	10/28/03	0	82.25	93.77	-1.04	7.59	95.66	-1.67	7.28
02	BF	D	1	1	b	10/28/03	10/28/03	0	82.71	93.62	-1.04	7.53	95.62	-1.76	7.55
02	BF	D	2	1	a	10/28/03	10/28/03	0	81.93	93.67	-1.04	7.76	95.79	-1.81	7.67
02	BF	D	2	1	b	10/28/03	10/28/03	0	82.25	93.69	-1.02	7.05	95.63	-1.65	7.05
02	BF	D	3	1	a	10/28/03	10/28/03	0	81.65	93.66	-1.03	7.61	95.62	-1.73	7.55
02	BF	D	3	1	b	10/28/03	10/28/03	0	82.25	93.77	-1.02	7.72	95.66	-1.72	7.28
02	BF	D	4	1	a	10/28/03	10/28/03	0	82.25	93.77	-1.02	7.72	95.66	-1.72	7.28
02	BF	D	4	1	b	10/28/03	10/28/03	0	82.71	93.67	-1.04	7.59	95.66	-1.67	7.28
02	BF	D	5	1	a	10/28/03	10/28/03	0	83.13	93.61	-1.02	8.06	95.61	-1.86	8.07
02	BF	D	5	1	b	10/28/03	10/28/03	0	81.65	93.66	-1.03	7.61	95.62	-1.73	7.55
02	BF	D	6	1	a	10/28/03	10/28/03	0	81.65	93.66	-1.03	7.61	95.62	-1.73	7.55
02	BF	D	6	1	b	10/28/03	10/28/03	0	82.25	93.77	-1.02	7.72	95.66	-1.72	7.28
02	BF	D	7	1	a	10/28/03	10/28/03	0	82.25	93.77	-1.02	7.72	95.66	-1.72	7.28
02	BF	D	7	1	b	10/28/03	10/28/03	0	82.71	93.67	-1.04	7.59	95.66	-1.67	7.28
02	BF	E	1	1	a	10/28/03	10/28/03	0	87.10	93.65	-1.02	7.49	97.25	-1.14	4.5
02	BF	E	1	1	b	10/28/03	10/28/03	0	86.35	93.67	-1.02	7.48	97.29	-1.15	4.44
02	BF	E	2	1	a	10/28/03	10/28/03	0	84.13	93.65	-1.02	7.42	96.92	-1.20	4.3
02	BF	E	2	1	b	10/28/03	10/28/03	0	84.35	93.65	-1.02	7.47	96.97	-1.25	4.35
02	BF	E	3	1	a	10/28/03	10/28/03	0	86.25	93.65	-1.02	7.48	96.87	-1.26	4.36
02	BF	E	3	1	b	10/28/03	10/28/03	0	85.45	93.65	-1.02	7.47	96.87	-1.25	4.35
02	BF	E	4	1	a	10/28/03	10/28/03	0	85.13	93.62	-1.02	7.47	96.87	-1.25	4.35
02	BF	E	4	1	b	10/28/03	10/28/03	0	85.45	93.62	-1.02	7.47	96.87	-1.25	4.35
02	BF	E	5	1	a	10/28/03	10/28/03	0	85.13	93.62	-1.02	7.47	96.87	-1.25	4.35
02	BF	E	5	1	b	10/28/03	10/28/03	0	85.45	93.62	-1.02	7.47	96.87	-1.25	4.35
02	BF	F	1	1	a	10/28/03	10/28/03	0	85.75	93.63	-1.02	7.47	97.12	-1.2	4.64
02	BF	F	1	1	b	10/28/03	10/28/03	0	85.62	93.77	-1.02	7.47	97.11	-1.25	4.65
02	BF	F	2	1	a	10/28/03	10/28/03	0	85.05	93.29	-1.02	7.47	97.11	-1.25	4.66
02	BF	F	2	1	b	10/28/03	10/28/03	0	85.25	93.37	-1.02	7.47	97.15	-1.25	4.62
02	BF	F	3	1	a	10/28/03	10/28/03	0	85.07	93.37	-1.02	7.47	97.12	-1.18	4.74
02	BF	F	3	1	b	10/28/03	10/28/03	0	85.41	93.32	-1.02	7.43	97.14	-1.22	4.66
02	BF	F	4	1	a	10/28/03	10/28/03	0	85.16	93.32	-1.02	7.43</			

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